Our Goal: All People in Region 5 Served by Public Water Supplies Will Have Water That Is Consistently Safe to Drink

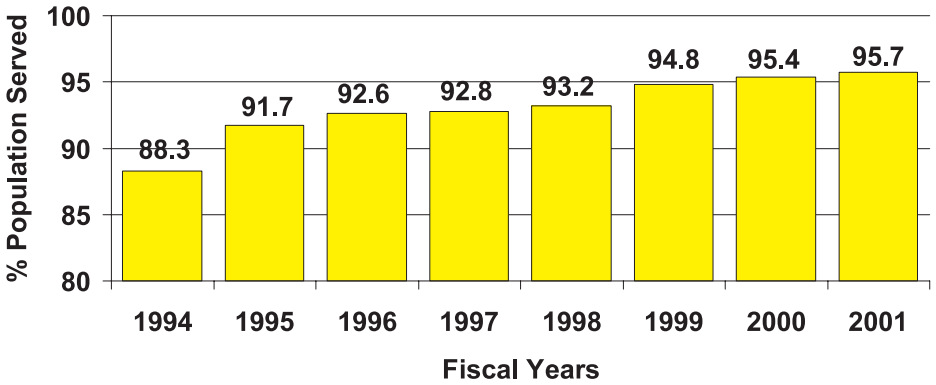
The vast majority of people in the Midwest have easy access to clean, safe drinking water. To make sure this does not change, EPA requires community water systems to sample and analyze their water regularly and to report on the quality of the drinking water that they are providing to the public. Each year, the Region 5 states receive analytical results for some 83 different contaminants found in samples collected from over 7,700 community drinking water supplies. As indicated in Figure 5-1, over 95 percent of the community water systems' customers receive water meeting all EPA health-based standards. The Region 5 states face a unique challenge in ensuring safe water in over 41,000 non-community water systems, or about 40 percent of the non-community water systems in the country. These non-community systems are usually very small and require extensive technical assistance.

The drinking water quality that we enjoy is no accident and should not be taken for granted. Region 5 and its state partners work with water

Community water systems are defined as systems that provide drinking water year-round to 25 or more of the same people or that have 15 or more water service connections. In addition, there are two other types of water systems: *non-transient non-community water systems* such as schools and *transient non-community water systems* such as highway rest stops. Each type has its own monitoring requirements.

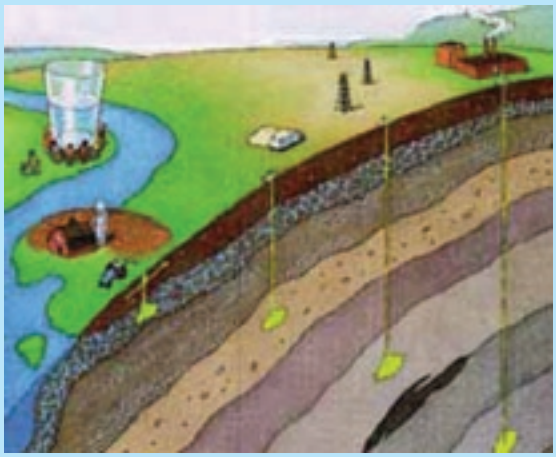
Figure 5-1

Percentage Population Served by Community Water Systems Meeting All Health-Based Standards Region 5 Totals



Source: EPA Region 5

In Region 5, about 23 million people (49 percent of the total population) rely on groundwater for their potable water supply, and the rest use surface water sources for their water supply.



Source: EPA

suppliers to minimize the presence of harmful contaminants in drinking water, including total coliform bacteria, lead, nitrates and pesticides. In Region 5, all six states have primary authority for implementing EPA's drinking water program.

The importance of maintaining a safe water supply led Congress to pass the Safe Drinking Water Act in 1974 and to amend the act in 1986 and 1996. Under the act, each municipality, community or other group that operates a community water system, including groups on tribal reservations, must regularly monitor the quality of its drinking water.

EPA does not require testing of private water supplies, such as those serving just one home. People using a private well, however, would be well advised to monitor their water for both nitrate and bacteria. Nitrate contamination can come from fertilizers, septic systems and animal feedlots, and it poses a significant problem in many Region 5 groundwater sources. Excessive nitrate levels in drinking water can cause serious illness or death for infants under the age of 6 months. Information on how well owners can ensure the safety of their water supply is available on EPA's web site at http://www.epa.gov/safewater/pwells1.html.

In addition, the Safe Drinking Water Act established an Underground Injection Control (UIC) Program to deal with the largely uncontrolled discharge of fluids into the subsurface through deep or shallow wells and subsurface fluid distribution systems such as many of the tilefields that distribute effluent from large-capacity septic tanks. Deep injection

Deep injection wells
Source: EPA

Storm sewer outfalls inventoried during source water assessments are manageable contaminant sources for surface water supplies such as that served by the Alpena, Michigan, Water Treatment Plant.
Photograph Courtesy of EPA

wells include those drilled to dispose of industrial and municipal wastes, the by-products of oil and gas production, and fluids involved in mineral production. Shallow wells account for nearly all point- source discharges into the subsurface except for domestic sewage from single-family septic systems and small nonresidential septic systems serving fewer than 20 people per day.

Understanding Groundwater Dynamics in Minnesota

To help private well owners and decision-makers understand groundwater dynamics, the Minnesota Pollution Control Agency's Rochester Office partnered with EPA and the Minnesota Department of Natural Resources to present "Rocks and Water: Understanding Minnesota's Limestone Country"on the porous karst geology that allows quick migration of contaminants into groundwater, and their subsequent, rapid and unpredictable migration to potential points of human exposure, such as water wells and surface waters. For more information about groundwater in Minnesota, see *http://www.pca.state.mn.us/water/southeast-gwp.html.*

What Are the Major Sources Of Contamination in Drinking Water?

Although we know a great deal about the health impacts of drinking water contamination, many questions remain. Research continues to provide new information on health effects and to identify new potential drinking water threats.

The major sources of drinking water contamination include spills and faulty fuel storage, waste disposal, agricultural and industrial practices. Microbiological or chemical pollutants are released into the environment from these sources and make their way into groundwater or surface water. Some contaminants found in certain areas of the Midwest, such as arsenic and radium, occur naturally in soil and rock.

Uncontrolled and improperly managed injection wells are one of the major pathways though which contaminants can reach underground aquifers. Deep injection wells can pose a threat if they are not properly regulated, but shallow wells have had a far greater impact in Region 5. As many as 500,000 shallow injection wells are thought to exist nationally, and funding to control them has been very limited. Through these wells, untreated contaminants are often discharged directly into

Underground Injection Wells for Wisconsin Brownfield Cleanup

A Burlington, Wisconsin, brownfield site located along the Fox River near downtown Burlington formerly contained a coal gasification plant that contaminated soil and the underlying portion of the shallow aquifer. Among the contaminants found at the site are benzene, toluene and xylene. Approximately 300 injection wells are being used to introduce a mixture of iron oxide and hydrogen peroxide into the subsurface to promote degradation of the hazardous substances present. This project is being managed by the Wisconsin Department of Natural Resources (WDNR) and is a joint effort between the Bureau of Drinking Water and Groundwater, which has provided guidance for use of such injection wells as well as general oversight for the project, and the Bureau of Remediation and Redevelopment, which is directing the cleanup. With bioremediation the increasing choice at many cleanup sites, the role of UIC wells in such activities is expected to increase.

Photograph by Andrew F. Boettcher

actual or potential drinking water sources, or where treatment does occur, as in septic tanks, it is often insufficient to remove organic compounds, solvents, viruses and other potential health threats.

What Are We Doing to Address the Problems?

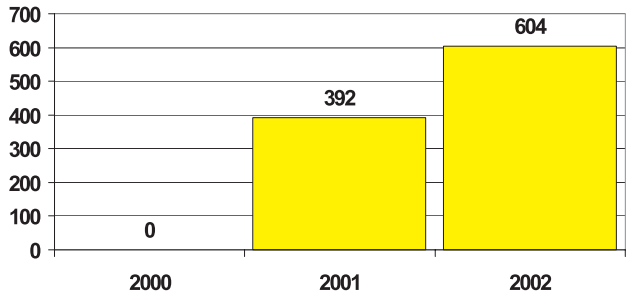
Source Water Protection

Preventing contamination from reaching drinking water supplies is the key to maintaining safe, affordable drinking water. To help accomplish this, states are establishing source water protection programs for drinking water supplies and are doing source water assessments to evaluate the potential for the water supplies to become contaminated. Figure 5-2 shows the number of assessments that have been completed in Region 5. Based on these assessments, source water protection areas are established and potential sources of contamination are identified. After the source water assessments are completed, activities to protect surface water and groundwater from the potential threats need to be identified and implemented. Protection efforts are most effectively implemented at the local level. Thus, the participation of the public in promoting protection of drinking water is key. It is much more expensive to clean up groundwater once it is contaminated than to prevent it from being contaminated in the first place.

The Region 5 states have been very active in source water protection. In Illinois, for example, the community of East Alton has been faced with a methyl tertiary butyl ether (MTBE) plume threatening the groundwater that is the source of its drinking water. MTBE is a natural gas derivative that boosts oxygen to make gasoline burn cleaner. Two leaking underground storage tank sites within the source water protection area for East Alton's water supply are being aggressively pursued for cleanup. Nearly $1 million has been spent to clean up each of the two sites, but the remediation is not yet complete. East Alton is also working on a groundwater protection ordinance and contingency planning procedures to safeguard its water supply from future problems.

Illinois has also adopted the state's first regulated recharge area regulation for the Pleasant Valley Public Water District. In the regulated recharge

Figure 5-2
Number of Community Water Systems With Source Water Assessments Complete Region 5 Totals



Source: EPA Region 5

area, a regulatory approach has been adopted to protect the district's source water protection area from potential contamination. Citizen involvement to support this action was key. The recharge area regulation requires existing and new potential sources of groundwater contamination to be registered with Illinois EPA. Certain types of new potential sources will be prohibited under the regulation, and a suitability assessment will be required for others.

In Michigan, 40 stakeholder groups were invited to assist with developing a Source Water Assessment Program (SWAP) by participating in the SWAP Advisory Committee. Implementation of the Michigan SWAP has strengthened federal, state and local partnerships to protect Michigan's public drinking water sources.

Michigan has also developed partnerships with EPA, the U.S. Geological Survey, the U.S. Army Corps of Engineers, the National Oceanic and Atmospheric Administration, the Detroit Water and Sewerage Department, Environment Canada and the American Water Works Association Research Foundation to develop a flow model used to define source water areas for 14 public water supply intakes on the connecting channels of the St. Clair River-Lake St. Clair-Detroit River system. These water supply intakes serve almost one-half of Michigan's population. Additional information on the Michigan SWAP and the Connecting Channels Flow Model is available at http://www.michigan.gov/deq and http://mi.water.usgs.gov.

Ohio EPA, with partial funding from a grant from EPA, partnered with the Great Lakes Rural Community Assistance Program to complete a regional source water assessment and protection plan for the karst region in Seneca, Sandusky, Huron and Erie counties. The karst region is characterized by high groundwater flow rates as well as a high susceptibility to and history of contamination. The protection area encompasses 15 public water systems that use groundwater and the watershed protection area for the City of Bellevue. Because groundwater in this region moves via large fractures and conduit flow, Ohio EPA delineated the entire region that contributes water via the karst system as a source water protection area. The karst region also includes portions of the watershed protection areas for Clyde, Tiffin and Fremont.

Underground Injection Control

Under the UIC Program, deep injection wells have been strictly regulated because they can cause great harm to aquifers used as sources of drinking water. EPA and Region 5 state agencies, which have primary authority for the UIC Program, have gone to great lengths to ensure that these wells are properly sited, designed, constructed and operated. Among the safeguards taken is ensuring that these wells are completed in deep formations well below usable aquifers and that the waste is confined by shale and other impermeable layers. Deep injection wells are also required to have several layers of pipe and cement and are tested on a frequent basis using sophisticated logging techniques to ensure that leakage does not occur. In addition, a search is conducted for abandoned wells and other boreholes that could be close enough to an injection well to serve as unintended conduits for the fluids injected. If such abandoned wells are found, they must be properly plugged before use of the injection well is authorized.

Because shallow injection wells clearly pose a threat to shallow aquifers, EPA developed new regulations that became effective on April 5, 2000, for two of the most endangering well types: large-capacity cesspools and motor vehicle waste disposal wells. New wells of both types are banned, and existing large cesspools must be closed by 2005. In the Midwest, all existing motor vehicle waste disposal wells will be closed or required to obtain a strict permit. Any such wells located in source water protection areas will be addressed first in a phasing approach. States with primary authority and EPA are now implementing the new regulations. For instance, of the 12 injection wells that Ohio EPA closed during state fiscal year 2002, seven were motor vehicle waste disposal wells. Ohio EPA has

Education Programs in Minnesota

As part of an ongoing effort to develop an informed citizenry and increase drinking water awareness among teachers and students, the Education Committee of the Minnesota Section of the American Water Works Association, in conjunction with the Science Museum of Minnesota, a premier organization for teacher education in the state, held a 4-day seminar, "Water Works! A Drinking Water Institute for Educators." The seminar was designed to teach Minnesota teachers about drinking water, get them involved in inquiry-based activities and have them develop a plan for incorporating lessons and activities involving drinking water into their science curriculum. The goal of the seminar program is to eventually produce high school graduates in Minnesota who are both knowledgeable about drinking water and able to apply their knowledge in their daily lives.

also completed a UIC inventory of endangering wells in five major Ohio counties, which included sending notifications to known motor vehicle repair facilities. The EPA Region 5 Direct Implementation Program, which covers Indiana, Michigan, Minnesota and tribal areas, has hired three new Class V field inspectors under the Senior Environmental Employment Program. Working on a county-by-county basis, these inspectors are identifying substantial numbers of motor vehicle waste disposal and other endangering wells. Regional office staff members are then working with the operators of these facilities to close or otherwise mitigate the problems caused by the wells.

Compliance Assistance

Region 5 states are providing compliance assistance to help water supply systems meet safe drinking water requirements. For example, the Indiana Department of Environmental Management (IDEM) initiated a compliance assistance program in July 2002 to help about 2,400 small systems serving fewer than 100 people each to do required water sampling for nitrate and bacteria analyses. If the required sampling and analysis are not done, the quality of the drinking water is unknown. IDEM is using state funds to analyze samples for the small systems. This small-system assistance program will be continued to complement IDEM's ongoing efforts to provide safe drinking water to the public.

WDNR has developed partnerships with state health agencies, the Wisconsin Department of Commerce, local municipalities and local health agencies to complete well sampling intended to determine whether arsenic levels in groundwater exceed the new safe drinking water standard that goes into effect in 2006.

In addition, WDNR created a public information brochure on arsenic in cooperation with the Wisconsin Department of Health and Family Services. Moreover, in 2000, informational meetings were held in many of the townships in the Lower Fox River area to educate local residents about arsenic in their water supplies and possible solutions

Source: EPA

Drinking Water Security

Following the events of September 11, 2001, EPA and the states have increasingly focused on protecting drinking water systems from possible terrorist threats. In Region 5, EPA has awarded over $5 million in grants to large public water systems in order to help them assess their potential vulnerabilities.

This effort represents a major step toward improving the security of large water systems and protecting the drinking water of millions of people. Each vulnerability assessment performed for a water system provides a prioritized plan for security upgrades, modifications of operational procedures, policy changes or a combination of approaches to mitigate the risks and vulnerabilities associated with the utility's critical assets.

to remedy the problem. See http://www.epa.gov/safewater/arsenic.html to get more information on the new arsenic standard for drinking water.

The vigilance of EPA's drinking water program extends beyond the tap. EPA is working cooperatively with the Region 5 states to

- Ensure that underground injection wells are properly drilled and operated so that groundwater aquifers are protected.
- Safeguard lakes and streams from spills of hazardous materials, effluent from sewage treatment plants and industrial facilities and runoff from agricultural and urban areas.
- Prevent contamination of groundwater and surface water by sponsoring household waste collection programs.

For more information on the Safe Drinking Water Act and frequently asked questions about drinking water, see EPA's web site at http://www.epa.gov/safewater or call the Safe Drinking Water Hotline at 1-800-426-4791.

Photograph by Jeffrey E. Edstrom

Consolidation of Tribal Public Water Systems

Small water supply systems often have difficulty complying with all the requirements necessary to ensure long-term protection of public health because of the complexities of drinking water regulations and of operation and management of a drinking water system. Therefore, Region 5 encourages consolidation of small tribal public water supply systems wherever possible. (EPA, not the states, has responsibility for overseeing tribal systems.) There are many benefits to consolidating small public water systems, such as reducing sampling and analysis costs, the required number of certified operators, the cost of source water protection efforts and the cost of the water produced. Consolidation also provides greater assurance of a safe, reliable supply of drinking water. During the past 5 years, a total of 26 tribal water supply systems have been consolidated with other systems, and about a dozen more consolidations are either proceeding or planned.